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For Attention: Colleen McCreadie

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The Environmental Practice
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Our Ref.: 998

Date: 9 February 2022

Dear Colleen

WOOD CHIP PILOT PLANT CONTAMINATION ASSESSMENT

Umvoto Africa (Pty) Ltd. (hereafter Umvoto) were appointed by The Environmental Practice (Pty) Ltd. to undertake a high-level contamination assessment for a pilot "wood chip" processing plant established on Erf 299 in Atlantis Industria, City of Cape Town Metropolitan Municipality, Western Cape Province. This letter outlines potential contamination associated with the pilot plant, and related activities, for the period February 2021 – July 2021. The assessment is done in support of the Section 24G application currently underway in terms of the National Environmental Management Act ([NEMA] Act No.107 of 1998).

The contamination assessment is informed by a site visit undertaken by Umvoto in January 2022 and by understandings gained from the following supporting documentation provided to Umvoto:

- Word document titled "*LCOA wood chip burn-off pilot facility on Erf 299, Atlantis: activities on site February 2021 – July 2021*" received 24/01/2022;
- Word document titled "*Site Sensitivity Verification Report: Erf 299, Atlantis Industrial*" received 21/01/2021;
- PowerPoint document titled "*LCOA PFDs full scale plant all processes Nov 2021*" received 21/01/2021;
- PDF titled "*Appendix E Site Photos*" received 21/12/2021;
- PDF titled "*MSDS of Wood chips*" received 24/01/2022;
- PDF titled "*SDS of Woodchip September 2021*" received 24/01/2022.

According to the above sources, "wood chip" is classified a general waste in terms of the National Environmental Management: Waste Act (Act No. 59 of 2008). It is understood that the "wood chip" comprises small brown wood fragments, silicate gangue and metal ore minerals (e.g., chalcopyrite). The pilot plant's purpose is to burn off the wood content, resize the remaining gangue and ore mix for transport and beneficiation off site.

In assessing potential soil, surface water and groundwater contamination related to the location of Erf 299, consideration needs to be given to the Atlantis Water Resource Management Scheme (AWRMS). The AWRMS, operated by City of Cape Town, supplies potable water to Atlantis and

surrounds and incorporates groundwater supply from the primary, unconfined Atlantis Aquifer (which underlies Erf 299) and includes the practice of Managed Aquifer Recharge (MAR) with treated effluent and stormwater from the Atlantis residential and industrial areas. This has relevance to Erf 299 in terms of potential contamination to the aquifer directly underlying Erf 299 as well as to the effluent and stormwater runoff generated on Erf 299. However, for the period February – July 2021 there were no connections to any municipal services, negating any contamination to the municipal wastewater or stormwater systems.

Erf 299 and immediate surrounds are devoid of surface water features or water courses (rivers, wetlands, springs) resulting in no contamination to any surface waters. The ground surface has been levelled and covered with a layer of laterite and a 20 x 20 metres concrete slab. The impermeable concrete underlying the "processing plant" (see **Figure 1**) and the compacted laterite layer aid in preventing infiltration of contaminants into the underlying Atlantis Aquifer. The water table beneath erf 299 is ~3-5 m deep, which naturally provides a vadose zone (comprised of silicate sand) for attenuation of contaminants that may have percolated beyond the laterite (mitigating infiltration to the aquifer).

The material that was processed by the pilot plant is considered to have posed limited to no threat of contamination. The wood chip feedstock is predominantly inert (wood and silica), with low proportions of metal ore minerals present. Due to the low tonnage, means of storage and handling, it is unlikely that contamination related to the oxidation and hydration of these minerals occurred (e.g., acid mine drainage). The volume of hydrocarbons (oil, diesel, grease) stored on site are not expected to pose catastrophic contamination risk, however some risk (low) of soil and groundwater contamination by these is a reality. Mechanical cleanup of the affected soils and improved storage areas (impermeable and bunded) will sufficiently mitigate these. Rainfall and contaminants mobilized by stormwater runoff pose a greater risk of contamination from a full-scale plant, but the amount of rainfall and runoff generated during the initial operations is considered to have resulted in little to no contamination.

Table 1 summarises the contamination severity and probability associated with activities on site between February 2021 and July 2021. Each activity is linked to a potential contamination event which may result in a hazard. The severity of the event is considered in relation to the probability of its occurrence. Mitigations in place for the period of operation are also considered.

The final outcomes in **Table 1** show negligible to low contamination associated with the activities on site. Recommendations for future contamination mitigation include reducing aerosol emissions/deposition, keeping the feedstock and product areas dry, appropriate bunding and impermeable surfaces for fuels and chemicals, drip trays, spill kits and a Stormwater Management Plan (SWMP) for separation of dirty and clean water (underway). Small scale leachate tests to assess the mobilization of contaminants when the feedstock or product gets wet is recommended to account for uncertainty in the Safety Data Sheet (SDS). Additional processes planned for a full-scale plant (processing of rubber liners and spent carbon) are addressed separately in an assessment for the full-scale plant.

Table 1 Contamination assessment for activities occurring between February and July 2021 on Erf 299, Atlantis.

Site Activity	Event / Occurrence	Hazard	Severity	Probability	Mitigation description
Site preparation (earth works, surface preparation)	hydrocarbon spill	soil contamination, infiltration to aquifer	negligible	low	machines in working order, no on-site refuelling or repairs
On site transport and storing feedstock	rainfall on feedstock (spill or stockpile)	run-off/leachate generated, infiltration to aquifer	negligible	low	bagged and covered, laterite and concrete surfaces
Processing feedstock (incl. burning off wood)	spill from diesel burners	soil contamination, infiltration to aquifer	mild	low	concrete surface
	emissions/aerosol deposition on ground	soil contaminated, infiltration to aquifer	mild	low	filters, impermeable surfaces
	rainfall on spilled drop-out / product (all sizes)	run-off/leachate generated, infiltration to aquifer	negligible	low	concrete/laterite surfaces
	rainfall on oversize material during cooling	run-off/leachate generated, infiltration to aquifer	negligible	low	tarpaulin, concrete surface
	rainfall on bagged final product (all sizes)	run-off/leachate generated, infiltration to aquifer	negligible	low	tarpaulin, concrete/laterite surface
Storing and handling hydrocarbons (diesel, oil, grease)	hydrocarbon spill	soil contamination, infiltration to aquifer	mild	low	Limited volume, concrete/laterite surface
Storing and handling chemicals (e.g., acids)	chemical spill	soil contamination, infiltration to aquifer	mild	low	concrete/laterite surface
Electricity supply - diesel generators	hydrocarbon spill	soil contamination, infiltration to aquifer	negligible	low	concrete/laterite surface
Storing re-use water	contaminated water spill	runoff generated, infiltration to aquifer	mild	low	limited volume, laterite surface
Dust suppression, washing surfaces	wetting and mobilisation of contaminants	runoff generated, infiltration to aquifer	negligible	low	laterite surface, no water supply
Sanitation - chemical toilet	chemical or organic waste spill	soil contaminated, infiltration to aquifer	mild	low	regular servicing, laterite surface

Figure 1 **Photograph taken by Umvoto of the pilot plant for processing of "wood chip". Components of the plant are labelled 1-8. (1) Telehandler loads feedstock into hopper from bags. (2) Feedstock is transferred from hopper via open screw conveyor belt into rotary kiln. (3) Feedstock is burned in rotary kiln at ~800-900°C. (4) Unfiltered aerosol emissions and dust from kiln door. (5) over size drop-out box and catchment tray. (6&7) Cyclone and filtered fines dropping into uncovered drum. (8) Filtered air discharge. (9) Limited trial screening of feedstock undertaken.**

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